

**Hybrid PIC Simulations of Stimulated Brillouin Scattering Including Ion-ion Collisions\*** P. W. Rambo, S. C. Wilks and W. L. Kruer, *University of California, Lawrence Livermore National Laboratory* -- We investigate the role of Coulomb collisions in non-linear saturation and heating due to stimulated Brillouin scattering (SBS) in laser heated plasmas. Ion-ion collisions are particularly relevant to SBS from gold plasma near the hohlraum wall, where the collision rate of heated ions can be appreciable compared to the acoustic frequency,  $v_{ii}/\omega_s \approx 0.1$ . Our kinetic modeling makes use of particle in cell (PIC) techniques with binary Monte Carlo (MC) particle-particle collisions that are equivalent to the Fokker-Planck collision operator. We also present results on a numerical instability<sup>1</sup> important to hybrid simulation of SBS. This instability, operative for large ratio of sound speed to ion thermal speed,  $ZT_e/T_i \gg 1$ , can lead to non-physical ion heating with attendant impact on instability saturation and reflectivity; we present new results on the effect of smoothing techniques to ameliorate this instability.

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